# Family Size in White Gay and Heterosexual Men

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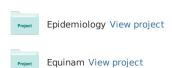University College London
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# Family Size in White Gay and Heterosexual Men

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There is some evidence for a genetic influence on sexual orientation. However, gay men have fewer children than heterosexual men. Increased fecundity in the biological relatives of gay men could offset this selection pressure. We measured family size in gay ($n = 301$) and heterosexual ($n = 404$) men, attending clinics for sexually transmitted infections. The main outcome measure was the number of each man's uncles and aunts, first cousins, siblings, nephews and nieces, and his own children. With the exception of the participants' own offspring, mean family size of each category of relatives was significantly larger for gay men (paternal and maternal total OR = 1.02, CI = 1.01–1.03). This remained the case after adjustment for other predictors of family size (paternal and maternal total OR = 1.02, CI = 1.00–1.03). We found increased fecundity in the relatives of gay men and this is one explanation of how a genetic influence might persist in spite of reduced reproductive fitness in the gay phenotype. There are, however, a number of alternative explanations for our finding, including unknown psychological and social factors, which might mediate the association between family size and sexual orientation.

**KEY WORDS:** homosexuality; family size.

## INTRODUCTION

How sexual orientation in men and women is determined is of considerable scientific interest. A number of factors have been reported in recent years, but two in particular are supported by considerable evidence. The first is that gay men are significantly more likely to come higher in the birth order in families, by which is meant that they are likely to have greater numbers of older siblings. This effect has been found mainly for number of older brothers (Cantor, Blanchard, Paterson, & Bogaert 2003). Only one study to date has reported that gay men also have greater numbers than expected of older sisters (Bogaert, 1998). Blanchard (2001) has estimated that the population attributable "risk" for homosexual orientation

due to older brothers is 24% for gay men with one older brother, 43% for gay men with two older brothers, and over 50% for those with three or more older brothers. Explanations offered for this consistent finding is the possibility of a maternal immune response by mothers to Y-linked histocompatibility antigens (Blanchard, 2001) or possible sexual contact with their older brothers (Jones & Blanchard, 1998). Less rigid parenting of younger sons which enabled them to admit to their sexuality must also remain a possibility.

The second main line of research is genetic. Male homosexuality has higher concordance in monozygotic than dizygotic twins, suggesting a possible genetic influence on sexual orientation (Bailey & Pillard, 1991; Kendler, Thornton, Gilman, & Kessler, 2000; Pillard & Bailey, 1998). However, gay men have far fewer children than heterosexual men (Bell & Weinberg, 1978) and thus selection pressure against any genetic influence would be considerable. One suggestion to explain this anomaly is that of a polygenetic trait in men that results in a personality more conducive to reproducing and supporting offspring (Miller, 2000). Although this trait in larger dose may produce male homosexuality (Miller,

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2000), greater reproductive fitness or fecundity in the biological relatives of gay than heterosexual men would offset the selection pressure against homosexuality. Our objective was to test the hypothesis that gay men have larger families than heterosexual men.

## METHOD

### Participants

We asked consecutive male attenders to two central London clinics for sexually transmitted infections (STI) to complete anonymous questionnaires. We did not pay the 1061 men who participated. Constraints imposed by the ethical committees approving the study meant that we were unable to collect any information on non-responders and thus the percentage of men who did not participate is not available.

### Measures and Procedure

After providing demographic information, participants were asked whether they identified themselves as "homosexual/gay, bisexual, or heterosexual/straight." They were then asked to complete three 7-point Likert scales relating to sexual orientation modeled on the Kinsey scale (Kinsey, Pomeroy, & Martin, 1948). Participants then gave information on numbers of individual family members, allowing us to calculate family size for each participant. To calculate family size variables, we counted each man's uncles and aunts, first cousins, siblings, nephews and nieces, and his own children. Parents and participants were not included since these values are constant for each man. Participants were asked to specify the numbers of younger and older siblings and their gender. The study was passed by the research ethics committees for each site.

Multiple response variables such as occupation and religion were examined for their distribution by sexual orientation and family size. Categories similar on these measures were amalgamated, to facilitate the analysis and the interpretation of results. Occupations were coded according to five social classes prior to data entry (Office of Population Censuses and Surveys, 1990).

A total of 1061 men reported whether they were gay, bisexual or heterosexual as well as completing Kinsey-type scales of sexual orientation. Self-identified sexual orientation was checked against the Kinsey scales to ensure that men identifying as gay or heterosexual were not actually reporting marked sexual attraction or experience which differed from their reported orientation. In fact, Kinsey scale responses wholly concorded with the reported sexual orientation. A total of 24 men were adopted and 15 did not answer the adoption question. These 39 men were excluded from the family size analysis since information about their biological family was likely to be unavailable or less reliable.

Seven of the 1022 remaining respondents did not complete the ethnicity and the sexual orientation questions and were excluded. We explored whether cultural differences between ethnic groups relating to sexual orientation and to family size might make comparisons across these groups invalid. We grouped ethnicity as white (white UK, white Irish, and white "other") and non-white (Black Caribbean, Black African, Indian, Pakistani, Bangladeshi, Chinese, Mixed, and other). Of the 294 non-white men, 214 (72.8%) reported being heterosexual compared to 404 (55.3%) of the 721 white men ($\chi^2(1) = 26.9$, $p < .001$). Of the 294 non-white men, 63 (21.4%) had missing occupation data compared to 72 (10.0%) of the 721 white men ($\chi^2(1) = 23.7$, $p < .001$). Family size also varied markedly between ethnic groups. For example, mean total family size in non-whites was 35.0 while that in whites was 19.9 ($t[726] = 9.27$, $p < .0001$). Because of these findings and missing data, we decided not to include the 294 non-white men in the main analyses of associations with sexual orientation. Of the remaining 721 men, 16 self-identified as bisexual and scored between 2 and 4 on the Kinsey sexual attraction, sexual history, and sexual dreams scales. Since these bisexual men may differ from both homosexual and heterosexual men, they were also excluded from the analysis, leaving a sample of 705 men.

Only 20 of the participants' siblings were aged under 10, of whom seven were aged under five, suggesting that these generations were largely complete. However, the low number of children of participant's siblings suggests that they were unlikely to have completed their own families when they participated in the study. Of the 11 ethnic categories included in the questionnaire, only White-Irish, White-British, and White-other ethnic groups contained more than 20 respondents and at least 30% gay men. Thus, to reduce variance in family size attributable to culture in the parents' and participant's generation, our analysis concentrated on these three populations.

Participants were less likely to complete the questionnaire for some larger, aggregated family size variables (e.g., providing number of siblings but omitting their children). However, for the most complex variables, there was no significant difference between gay (30.2%) and heterosexual men (31.4%) failing to complete all required information ($\chi^2(1) < 1$, ns).

| Sociodemographic characteristics | Gay | Heterosexual | $p$ |
|---|---|---|---|
| Age (in yrs) | | | |
|   Mean | 36.9 | 32.1 | <.0001 |
|   *SD* | 9.8 | 10.0 | |
| Education | | | |
|   School only | 72 (24%) | 98 (24%) | *ns* |
|   College and higher | 229 (76%) | 304 (76%) | |
| Employment | | | |
|   Employed | 240 (80%) | 360 (89%) | <.001 |
|   Unemployed | 61 (20%) | 43 (11%) | |
| Religion | | | |
|   Protestant | 146 (49%) | 123 (32%) | <.001 |
|     Christian | 152 (51%) | 264 (68%) | |
|   Other | | | |
| Social class | | | |
|   Nonmanual | 237 (86.5%) | 265 (73%) | <.001 |
|   Manual | 37 (13.5%) | 97 (27%) | |
| Clinic | | | |
|   Clinic A | 133 (44%) | 261 (65%) | <.001 |
|   Clinic B | 168 (56%) | 143 (35%) | |

*Note*. Numbers vary due to missing data.

## RESULTS

### Sociodemographic Characteristics

The gay men were older and more likely to be unemployed, Protestant, and in non-manual occupations than the heterosexual men (Table I). Fewer adopted men (8/23, 34.8%) self-identified as heterosexual than non-adopted men (619/1016; 60.9%) ($\chi^2(1) = 6.4$, $p = .01$). Sexual orientation was also analyzed by Kinsey scales, and we were able to redefine bisexuals as those scoring 2–4 on the Kinsey sexual attraction, history or dream scales. After exclusion of these "true" bisexuals, 9/23 (39.1%) adoptees were heterosexual compared with 630/994 (63.5%) non-adopted men ($\chi^2(1) = 5.7$, $p = .02$).

### Siblings

Gay men had more older brothers and older sisters than heterosexual men, a difference that remained significant after adjustment for age, occupational class, and religion (Table II).

In order to explore the sibship composition more fully and to test whether the finding for older sisters was not merely due to a correlation between number of older brothers and older sisters, we undertook a logistic regression analysis in which number of younger sisters, younger brothers, older sisters, and older brothers were entered into the regression as predictors of sexual orientation, and those that were not significant were removed in a step wise procedure (Table III). While number of older brothers and older sisters independently predicted a gay sexual orientation, younger brothers and younger sisters did not.

### Family Size Analysis

Associations between sexual orientation, sociodemographic variables, and family size were used to guide a logistic regression analysis. Odds ratios (OR) for being homosexual were firstly adjusted for age and clinic site in case of any cluster effect. Other variables significant in the univariate analyses were then added to the model and the effect on associations with sexual orientation was noted. Continuous variables, such as age and family size, were added into the model in their continuous form but as a check on the influence of outliers continuous variables were subsequently entered into the model re-coded as deciles and as square roots.

With the exception of the participants' own offspring, mean family size of each category of relatives was consistently larger for gay men (Table II). The OR linking family size to self-identification as gay was also consistently larger. There were several possible confounders in this association. Gay men were more likely than heterosexual men to have attended one particular clinic, work in non-manual occupations, and be from Protestant backgrounds. Gay men were also older than heterosexuals (Table I). To adjust for overall "family age," we used a form of mean sibling age, taking the mean age of the participant and up to his eldest four siblings. This aggregate age measure was a more powerful confounder of associations between family size and sexual orientation. A limit of the four eldest siblings was set to minimize the number of participants excluded due to missing data.

After adjustment, total family size remained significantly larger for gay men only on the paternal or on the paternal plus maternal, sides (Table II). This was true for family sizes only at the parents' and participant's generations (completed generations) or when the offspring/nieces and nephews generation was included. Although the trends were also for larger family sizes on the maternal side alone, they were not significant after adjustment.

Our main results remained robust after transforming continuous variables with large outliers (e.g., siblings) into their deciles or square roots. This ensured that individual participants with very large families were not exerting undue influence on the overall results. In addition, we conducted a multiple linear regression of sexual

**Table II.** Associations of Family Size with Sexual Orientation

| | N | M | SD | Range | OR[a] Unadjusted (95% CI) | p | OR adjusted for age,[b] site, class, religion | p |
|---|---|---|---|---|---|---|---|---|
| **Paternal aunts & uncles** | | | | | | | | |
| Gay | 280 | 3.0 | 2.3 | 1–12 | 1.09 (1.01–1.16) | .019 | 1.12 (1.03–1.22) | .012 |
| Heterosexual | 359 | 2.6 | 2.3 | 0–13 | | | | |
| **Paternal cousins** | | | | | | | | |
| Gay | 261 | 6.0 | 6.3 | 0–40 | 1.02 (1.00–1.05) | .074 | 1.03 (1.00–1.07) | .045 |
| Heterosexual | 337 | 5.1 | 6.0 | 0–37 | | | | |
| **Maternal aunts and uncles** | | | | | | | | |
| Gay | 295 | 3.0 | 2.9 | 0–23 | 1.06 (1.00–1.12) | .074 | 1.01 (.96–1.12) | ns |
| Heterosexual | 377 | 2.6 | 2.2 | 0–12 | | | | |
| **Maternal cousins** | | | | | | | | |
| Gay | 277 | 5.9 | 6.9 | 0–35 | 1.02 (1.00–1.05) | .049 | 1.02 (.99–1.06) | ns |
| Heterosexual | 358 | 4.9 | 5.5 | 0–47 | | | | |
| **Younger brothers** | | | | | | | | |
| Gay | 279 | .46 | 0.87 | 0–9 | .94 (.78–1.15) | ns | 1.02 (.82–1.27) | ns |
| Heterosexual | 379 | .49 | 0.77 | 0–5 | | | | |
| **Younger sisters** | | | | | | | | |
| Gay | 281 | .45 | 0.77 | 0–6 | 1.00 (.81–1.22) | ns | 1.09 (.86–1.38) | ns |
| Heterosexual | 375 | .46 | 0.77 | 0–6 | | | | |
| **Older brothers** | | | | | | | | |
| Gay | 280 | .66 | 0.88 | 0–4 | 1.37 (1.13–1.67) | .002 | 1.31 (1.03–1.65) | .026 |
| Heterosexual | 379 | .47 | 0.71 | 0–3 | | | | |
| **Older sisters** | | | | | | | | |
| Gay | 281 | .59 | 0.88 | 0–4 | 1.29 (1.06–1.57) | .011 | 1.30 (1.02–1.64) | .031 |
| Heterosexual | 376 | .43 | 0.73 | 0–5 | | | | |
| **Paternal 'Complete generation'[c]** | | | | | | | | |
| Gay | 243 | 11.1 | 8.7 | 0–52 | 1.02 (1.00–1.04) | .021 | 1.03 (1.00–1.05) | .019 |
| Heterosexual | 325 | 9.5 | 8.2 | 0–52 | | | | |
| **Maternal 'Complete generation'[c]** | | | | | | | | |
| Gay | 263 | 10.8 | 9.5 | 0–47 | 1.02 (1.00–1.04) | .034 | 1.02 (1.00–1.04) | ns |
| Heterosexual | 347 | 9.3 | 7.7 | 0–60 | | | | |
| **Pat + Mat 'Complete generation'[c]** | | | | | | | | |
| Gay | 239 | 19.8 | 14.8 | 0–99 | 1.02 (1.00–1.03) | .017 | 1.02 (1.00–1.03) | .025 |
| Heterosexual | 322 | 16.9 | 13.3 | 0–72 | | | | |
| **Nieces & nephews** | | | | | | | | |
| Gay | 275 | 2.7 | 3.5 | 0–35 | 1.17 (1.10–1.24) | .001 | 1.11 (1.03–1.19) | .005 |
| Heterosexual | 380 | 1.4 | 2.5 | 0–11 | | | | |
| **Offspring** | | | | | | | | |
| Gay | 301 | .002 | 0.43 | 0–4 | 0.47 (0.34–0.65) | <.001 | 0.31 (0.21–0.47) | <.001 |
| Heterosexual | 403 | 0.36 | 0.83 | 0–11 | | | | |
| **Paternal total[d]** | | | | | | | | |
| Gay | 243 | 13.5 | 10.3 | 0–60 | 1.03 (1.01–1.05) | .002 | 1.02 (1.00–1.05) | .036 |
| Heterosexual | 325 | 10.9 | 9.1 | 0–59 | | | | |
| **Maternal total[d]** | | | | | | | | |
| Gay | 263 | 13.4 | 11.5 | 0–65 | 1.04 (1.01–1.05) | .001 | 1.02 (1.00–1.04) | .058 |
| Heterosexual | 346 | 10.6 | 7.9 | 0–54 | | | | |
| **Paternal + Maternal total[d]** | | | | | | | | |
| Gay | 239 | 22.3 | 16.4 | 0–90 | 1.02 (1.01–1.03) | .001 | 1.02 (1.00–1.03) | .029 |
| Heterosexual | 322 | 18.1 | 13.3 | 0–92 | | | | |

[a]Odd ratios for identifying as homosexual, p value for Wald test. OR represents the increase in odds per additional family member.
[b]Age variable = mean age of (proband + up to four eldest sibs) (see text).
[c]Completed generation = aunts + uncles + cousins + siblings, but excludes the offspring and nephews/nieces generation who may not be complete yet.
[d]Totals = (Mat/Pat) aunts + (Mat/Pat) uncles + (Mat/Pat) cousins + siblings + nieces & nephews + offspring; Mat = maternal. Pat = paternal.

**Table III.** Analysis of Sibships as Predictors of a Homosexual Orientation

| Steps | Siblings | OR | p | CI of OR |
|---|---|---|---|---|
| Step 1 | Older brothers | 1.37 | .003 | 1.12–1.69 |
| | Older sisters | 1.22 | .054 | 0.99–1.50 |
| | Younger brothers | 0.99 | ns | 0.81–1.20 |
| | Younger sisters | 1.03 | ns | 0.84–1.28 |
| Step 2 | Older brothers | 1.38 | .002 | 1.12–1.69 |
| | Older sisters | 1.23 | .050 | 1.00–1.50 |
| | Younger sisters | 1.03 | ns | 0.84–1.27 |
| Step 3 | Older brothers | 1.38 | .002 | 1.12–1.69 |
| | Older sisters | 1.23 | .047 | 1.00–1.50 |

orientation on total family size, as a continuous variable. Once again, sexual orientation significantly predicted family size after adjustment for confounders.

## DISCUSSION

Our main finding was that gay men were members of significantly larger families than heterosexual men. We also found that gay men had more older brothers and sisters than heterosexual men and that men who reported that they were adopted were more likely to report that they were gay.

This was a relatively large sample of gay and heterosexual men who were recruited in a manner unlikely to be influenced by our hypothesis. While the setting of the study in STI clinics provides an unrepresentative sample of the total male population, this is equally true for both the heterosexual and homosexual men. Therefore, although selection bias in our sample remains a possibility, it is difficult to see how it might work. All the men were clinic attenders and it seems implausible that gay men with bigger families systematically attend STI clinics more than those with smaller families. The gay men were more likely to be in non-manual occupations and from Protestant backgrounds, factors that might predict lower family sizes. However, these confounders were adjusted for in our analysis and thus are unlikely to be explanations for our findings.

We do not know what proportion of men who today might define themselves as gay conducted heterosexual relationships and fathered children over past millennia. However, our results must be viewed in the context of the past 50 years, an era in Western society in which gay men have been under less pressure to marry and reproduce. The argument might be put forward that selection pressures in the past against homoerotic orientation were non-existent because in the past men with little or no attraction to

women married and were equal in fecundity to men who were attracted to women. It is difficult to prove or disprove this although we are unaware of any evidence to support such a proposition.

An excess of older brothers is a consistent finding in gay men(Cantor et al., 2002), but the excess of older sisters is novel. There was no imbalance in gender in any category of relatives across the three generations, making an X-linked, sex-ratio altering genetic effect unlikely (Bailey et al., 1999; Turner, 1995). The birth order effect for gay males has been interpreted as a possible maternal immune reaction against Y-linked histocompatibility antigens (Blanchard, 2001) that results in homosexuality, feminization, and lower birth weight (Blanchard, 2001; Blanchard et al., 2002). However, it is difficult to see how this might be so if our finding about older sisters is upheld.

We are unaware of any other study of the relationship between familial reproductive success and a behavioral phenotype in man. This study does not prove that there is a heritable component to the gay phenotype. However, the findings we report leave such a possibility open. If there were no such effect, then it would be hard to explain how a heritable component to a homosexual orientation could persist. It would also be hard to explain why, even if there were no heritable component, barriers to male homoerotic orientation have not evolved given the markedly reduced fecundity of gay men. The existence of genes which may reduce the individual's reproductive success but increase that of their close relatives has been invoked to explain, for instance, "altruistic" behaviors (Hamilton, 1964; Wilson, 1975). If a genetic influence on sexual orientation is associated with increased reproductive fecundity in the biological relatives of gay men, this suggests how a genetic influence might persist in spite of reduced reproductive fitness in the gay phenotype. One can speculate that inheritance of a number of genes that affect personality, nurturing, and masculine behavior make heterosexual males that carry such alleles more attractive to females and more successful fathers (Miller, 2000). How our findings on adoption fit into this picture is less clear since giving up children for adoption might be regarded as one indication of poorer skills in bringing children to adulthood.

Our study does not exclude alternative psychological or social reasons for gay men being members of larger families. Indeed, if the explanation is genetic, it is striking that the effect is measurable over only three complete generations. Weak effects would only be seen over many generations. Whatever the underlying cause of this association, our findings are a novel addition to the literature regarding sexual orientation and families.

## ACKNOWLEDGMENTS

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